

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8

LINCOLN PARK CERCLA SITE
RESIDENTIAL SOILS SAMPLING PROJECT



FALL 2005

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JANUARY 25, 2006

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U.S. EPA, Region 8
Lincoln Park CERCLA Site
Residential Soils Sampling Project

I. INTRODUCTION

The Lincoln Park Superfund (CERCLA) Site is located in Fremont County, Colorado, approximately 1-½ miles south of Canon City, 96 miles south of Denver, and 26 miles northwest of Pueblo. The Superfund Site includes Cotter Corporation's Canon City uranium mill facility and a portion of the surrounding property, and a portion of the unincorporated community of Lincoln Park.

Operable Unit 2, which is the Lincoln Park Study Area, is the subject of the residential soil sampling scope of work and is summarized by this report. In addition to the active uranium mill, six different historic smelting and milling operations have been located in the study area. The major industrial and smelting operation in the area consisted of base metal production (lead, zinc, and copper) and the milling of ores from the uranium mines located to the northwest of Canon City.

II. OBJECTIVE

The objective of the scope of work was to collect residential soil samples from the Lincoln Park community to be analyzed for lead in soils. This effort was coordinated with the U.S. EPA, Region 8 (EPA) and with the Center of Disease Control's Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR conducted a separate sampling study on indoor dust and blood lead concentrations from within the study area.

III. SCOPE OF WORK TASKS

- 1) Conduct residential soils sampling for 22 residences. Representative samples of yard soil were collected from randomly selected locations of areas around the residence as described below. Collected and prepared samples were analyzed on-site using a "field" X-Ray fluorescence Analyzer (XRF); Niton XL 309 Spectrum Analyzer. Confirmation analysis was performed by an off-site laboratory (Evergreen Analytical) to verify total lead concentrations recorded by field XRF analysis for each of the same composite samples collected.

Each property in the study area was sampled using the following scope of work guidelines:

- Samples were collected from each of the following areas, as applicable: front, side, and back yards; vegetable garden area(s); other garden areas(s); areas of bare soil; and distinct play areas or other area of typical heavy use by children where soil is bare.

- For each area sampled, one composite sample was prepared from sub-samples that are representative of the soil conditions within the area.
- For each area sampled, one composite sample was collected from each of two depth intervals: 0 to 2 inch and 2 to 6 inch, except in garden areas where the depth of sampling will be from the surface to at least 6 inches and at most 12 inches such that sampling extends to the base of tilled or worked soil.
- Soil analyses for lead were performed in accordance with USEPA SW-486 Method 6010-Soils, Inductively Coupled Plasma (ICP) for laboratory analysis; and field X-Ray Fluorescence (XRF) for on-site soil analysis. Soil samples collected; composited and XRF analyzed were sealed in laboratory glass sample jars, logged on custody sheets, held by the sampler until released to the off-site laboratory sample receiving entity – Evergreen Analytical. **Reference: Appendix B – Sample Custody Sheets and Appendix C – Off-Site Laboratory Analytical Results.**

Appendix D summarizes and compares residential soils analysis for lead by address; XRF on-site analytical result and off-site laboratory analytical result.

The sampling team prepared a sketch for each residence and surrounding property showing all bare areas, gardens, and play areas. The locations of all individual sub-samples were marked on the site sketch map with associated composite samples numbers. All sampled areas were also delineated on the site sketch map. Reference: **Appendix A - Lincoln Park Residential Soils Sampling Study Site Sketch Maps.**

2) Sample Location Determination:

Front/Back/Side Yard samples:

Separate samples were collected from the front and back yards. A separate sample(s) were also collected from side yards. Each yard sampled was composited, which was comprised of at least three sub-samples. One composite sample was collected from each of two depth intervals: 0 to 2 inches, and 2 to 6 inches below ground surface.

Garden area samples:

Where a residential property within the study selection had a distinct garden area; a sample was collected from at least every 30 square feet. A garden area may be either a vegetable garden; or a series of similar flower

beds. A minimum of three sub-samples were collected from a depth interval representing the depth of worked soils and composited to obtain a single representative sample. The number of sub-samples collected depended on the total area sampled up to a maximum of 6 sub-samples per garden area. The maximum depth of sampling was 12 inches.

Bare area samples:

Bare areas, if any, of at least 9 square feet – including bare piles of soil, gravel driveways and walkways – were identified visually. The project scope of work allowed for the sampling and analysis of up to three distinct bare areas from a single residential property. Within each separate bare area identified, three sub-samples were collected from each of two depth intervals: 0 to 2 inches, and 2 to 6 inches. For each bare area and each depth interval, the three sub-samples were composited to obtain one sample.

Play area samples:

Additional samples were collected from bare-soil play areas, if any existed at the residential property. The sampling procedures used for bare areas was also used in each play area, except in the case of sand boxes where one composite sample was collected from the total depth of sand present, regardless of thickness.

3) Sampling Protocol:

Sampling protocol utilized for this project required that each residential soil sample collected be a composite. To facilitate the compositing of each sample; soil samples were collected from randomly selected locations in each of the identified areas for a given residence, i.e. Front Yard (FY); Back Yard (BY); Side or South Yard (SY); East Yard (EY); West Yard (WY); Garden Area (GA); Play Area (PA); Bare Area (B); etc. Soil samples from each of the identified areas were collected in a stainless steel mixing bowl; from which a composite sample was mixed and sampled. Between each residential sample location, i.e. front yard, back yard, etc. – the sampling equipment (shovel, mixing spoon and mixing bowl) were cleaned and rinsed with distilled water.

Each composite sample was placed into a laboratory prepared glass sample jar; analyzed in the field using a Niton 309 lead soil analyzer and capped for eventual laboratory ICP lead analysis. Field XRF analytical results were recorded in the project field log-book and identified by address number and location abbreviation; XXXX-YY, where YY

indicates sample location identified as described in the above paragraph and XXXX is the residential address number.

4) Project Photographs:

Sample location and Property Photographs were taken for each of the properties sampled as part of this scope of work study. Project photos are written on a CD and are included with this report as an attachment.

IV. SAMPLE STUDY OBSERVATION AND RESULTS

The following summary discusses site observations; field XRF residential soil sample results; and off-site laboratory duplicate sample results. None of the properties sampled appeared to be distressed by the presence of mine working or mine waste. Some of the properties were distressed due to current utilization and are noted in the below discussions:

- 1) **1004 South 1st Street.** This property is situated on a corner lot with a constructed and occupied private residence. The home is relatively new. Landscaping and outside improvements are in stable and satisfactory condition. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1004-BY	125	91
1004-FY	179	150
1004-G	153	120
1004-PA	172	160

- 2) **849 South 7th Street.** This property is situated on a corner lot with a constructed and occupied private residence. The home and out buildings were constructed more than fifty years ago and the current outside state of repair and condition are reflective of their age. Landscaping and garden areas are well maintained and are stable. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
849-BY	254	220
849-FY	167	130
849-NY	98	120
849-SY	198	200

- 3) **1409 South 9th Street.** This is a commercial property with a sited grocery store/market. The building is over 50-years old with many modifications and up-grades. A separate storage structure is located on the west

property boundary. A private residence is located to the north; a residential sub-division is located to the west and a restaurant/lounge located to the south. The exposed property is paved with several hard pack soil areas. One (1) composite sample was collected and prepared from the south parking lot area:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1409-SP	139	130

- 4) **1512 Cedar Street.** This property is situated in a rural area on a relatively large lot. The residence is relatively new and is well maintained. Landscaping and garden areas are well maintained and stable. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1512-FY	158	110
1512-G	204	190
1512-PA	99	88
1512-SY	206	160

- 5) **1526 Cedar Street.** This property is situated in a rural area with a highly developed agricultural activity and farm machinery storage. The residence is of modular construction. Out buildings are much older than the residence and are in a state of minimal repair. Live stock animals are maintained on the property and evidence of animal harvesting is present in the form of hides and other rendering. Equipment and vehicle storage on site is haphazard with some staining of soils from equipment/vehicle liquids evident. Three (3) composite soil samples were collected and prepared from the following property area locations;

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1526-B	97	38
1526-FY	77	47
1526-SY	43	65

- 6) **1529 Cedar Street.** The property is situated in a rural area on a relatively large lot. Residence and out buildings are relatively new and are well maintained. Landscaping and garden areas are in various conditions; ranging from well maintained lawns to dry-depleted garden areas. The property has a constructed play area with play equipment and an above ground pool area. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1529-BY	132	49
1529-FY	78	35
1529-P	93	110
1529-PA	73	35

- 7) **1607 Cedar Street.** The property is situated in a rural area on a relatively large corner lot. Residence and out buildings are older than fifty-years and are in various states of repair. Landscaping is minimally maintained. The property has a large field located to the north of the residence. Three (3) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1607-BF	73	58
1607-BY	113	77
1607-FY	98	65

- 8) **1634 Cedar Street.** The property is situated in a rural area on a relatively large lot. The property has located on it a commercial storage operation. The property has two constructed residences and out buildings. The property buildings are well maintained. Landscaping and garden areas vary in their physical state. Portions of the property are used for storage of old equipment and drums. A play/pool area is located to the west of the main residence. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1634-BS	168	86
1634-FY	124	130
1634-PA	87	44
1634-SY	79	61

- 9) **1527 Chestnut Street; Trailer Space 20.** The property is a trailer space located within a residential trailer court. The trailer is relatively old, but maintained. A storage shed is located on the property. Landscaping is minimally maintained. Two (2) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1527-BY	26	32
1527-SY	34	38

- 10) **1635 Chestnut Street.** The property is situated in a rural area on a moderate size lot. The residence, garage and out buildings are older than

fifty-years and are well maintained. Landscaping and garden areas are mature, but maintained. An agricultural use field (hay) is located to the north of the residence and is part of the property. Three (3) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1635-BY	137	100
1635-FY	148	170
1635-NY	104	120

- 11) **1705 Chestnut Street.** The property is situated in a rural area on a moderate size lot. The residence and out buildings are older than fifty-years and are relatively well maintained. The landscaping is mature and not maintained. The play area is located to the west of the back yard and contains play equipment. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1705-BY	64	80
1705-FY	96	49
1705-NY	107	260
1705-PA	53	45

- 12) **1755 Chestnut Street.** The property is situated in a rural area on a relatively large lot. Portions of the property are used for agricultural and farm purposes. The residence is relatively new/re-furnished. Outbuildings are older, but well maintained. Landscaping and garden areas are mature, but maintained. The play area is constructed and equipped. Five (5) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1755-FY	93	30
1755-NG	40	61
1755-NSY	55	28
1755-PA	42	31
1755-WG	89	63

- 13) **715 Cyanide Street.** The property is located in a residential neighborhood. The residence is approximately thirty-years old and is in a poor state of repair. Landscaping and garden areas are mature, but distressed due to poor maintenance. The front yard is used for vehicle parking and storage. Two (2) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
715-BY	23	26
715-FY	36	43

- 14) **1340 Grand Avenue.** The property is located in a rural area on a relatively large lot. The residence, garage and out buildings are older than fifty-years and adequately maintained. The back yard contains a fenced play area with equipment. Landscaping and garden areas are mature and are in various levels of maintenance. A large garden area is located on the south portion of the property. Agricultural use of the property was evident with various vegetable gardens. Six (6) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1340-BY	164	130
1340-EYB	99	78
1340-FY	136	140
1340-G	186	130
1340-PA	18	21
1340-PP	153	120

- 15) **1630 Grand Avenue.** The property is located in a rural area on a relatively large lot. The residence and out buildings are older than fifty-years and are in varying degrees of repair and maintenance. Landscaping and garden areas are mature and maintained. Portions of the property are used for agricultural and livestock use. The back yard contains a play area with equipment. Six (6) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1630-BY	221	190
1630-EY	142	150
1630-FY	193	200
1630-PA	126	100
1630-SG	135	87
1630-WG	150	130

- 16) **1615 Locust Street.** The property is situated in a residential area on a typical residential size lot. The residence is relatively new and in a moderate state of repair. The back yard contains a fenced dog kennel. The landscaping is mature and varies from poor in condition to one that is maintained. The driveway area is used for storage of equipment and other materials. Three (3) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1615-BY	79	73
1615-D	125	200
1615-FY	92	77

- 17) **1619 Locust Street.** The property is situated in a residential area on a typical residential size lot. The residence and garage are relatively new and are well maintained. The back yard contains a fenced dog kennel. The landscaping is mature and is one that is well maintained. Two (2) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1619-BY	56	22
1619-FY	142	78

- 18) **1227 Poplar Street.** The property is situated in a rural area on a large lot. The residence and garage/shop area are relatively new and well maintained. Landscaping is mature and well groomed. A portion of the property is used for recreational purposes and was sampled. A chicken coop is located on the east side of the garage/shop. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1227-CR	124	75
1227-EY	26	21
1227-SY	47	25
1227-WG	149	140

- 19) **1524 Poplar Street.** The property is located in a rural area on a moderate size lot. The residence and garage are relatively new and well maintained. Landscaping is mature and is well maintained. A horse coral is located on the property. Portions of property are gravel covered. Five (5) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1524-BY	93	94
1524-C	112	81
1524-EY	123	65
1524-FY	95	79
1524-G	96	58

20) **1625 Poplar Street.** The property is located in a rural area on a moderate size lot. The residence is approximately thirty-years old and in a state of disrepair. The driveway is unpaved and eroded. Landscaping has been left un-attended and has become weed invested. Two (2) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
1625-BY	109	100
1625-FY	70	85

21) **72 Savage Loop.** The property is located in a relatively new sub-division to Canon City. The residence and garage are relatively new and are well maintained. Landscaping is mature and well groomed. Significant portions of the landscape are covered with geo-textile and colored rock. The east property boundary borders drainage and is barren. Historical mill and mining activity occurred to the east of the property. Five (5) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
72-BY	130	170
72-EB	12	11
72-FY	58	33
72-NY	20	26
72-SY	219	200

22) **84 Savage Loop.** The property is located in a relatively new sub-division to Canon City. The residence and garage are relatively new and are well maintained. Landscaping is mature and well groomed. Significant portions of the landscape are covered with geo-textile and colored rock. The east property boundary borders drainage and is barren. Historical mill and mining activity occurred to the east of the property. Four (4) composite soil samples were collected and prepared from the following property area locations:

<u>Sample Number:</u>	<u>Field XRF (mg/Kg):</u>	<u>Laboratory ICP (mg/Kg):</u>
84-EBARREN	14	72
84-FY	160	110
84-NY	172	130
84-SY	136	87

APPENDIX A

**Lincoln Park Residential Soils
Sampling Study
Site Sketch Maps**

APPENDIX B

**Lincoln Park
Sample Custody Sheets**

APPENDIX C

**Lincoln Park
Off-Site Laboratory Analytical Results**

APPENDIX D

**Lincoln Park
Sample Summary Results
Residential Soils for Lead
On-Site XRF
And
Off-Site ICP**